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JAPAN'S ENERGY POLICY: 1986 UPDATE

Summary

Two factors -- the glut of crude oil on world markets (and the consequent sharp price drop) and the significant appreciation of the yen against the American dollar -- combined in 1985 and 1986 to goad Tokyo into rethinking fundamental aspects of the nation's energy policy. After a decade of dealing with supply shortages and rapid price increases, end-users were suddenly faced with the exact opposite, leading to calls for changes in government policies. While conservation, supply and utilization diversification will remain key aspects of Japanese energy policy, important changes are being made in price-support, petroleum product import, coal and nuclear policies.

The Aggregate Picture

Supply and Demand - According to the Ministry of International Trade and Industry, Japan consumed 1.6 percent more energy of all types in fiscal 1985, while overall supplies grew 0.7 percent (Tables 1-2). Imported crude oil's part in the supply picture continued to diminish, putting Japan closer to its goal of reducing oil dependence to less than 50 percent. There was a slight rise in oil consumption due mostly to an upsurge in gasoline usage. Overall oil imports declined slightly in 1985 as new Japanese wells came on-line and consumption declined (Table 3). The drop in the price of oil was quite dramatic in 1986 (Table 4) as costs fell 63 percent in dollar terms and 71 percent in yen terms between January and August.

Imports of non-crude-oil energy products showed various responses to the increased price competitiveness of oil-based sources (Tables 5-6). Steam coal

imports rose strongly, not because of increased demand for electricity but rather because of deliveries from Australian and Canadian coal mines developed by Japanese operations. Demand for coal for steel and coke making was sluggish since Japanese steelmakers faced weak markets. Liquefied natural and petroleum gases also continued to grow in popularity, probably due to greater industrial use of cogeneration equipment.

Production of electricity continued to expand in 1985 and 1986 in line with growing demand (Tables 7-8). Hydroelectric power supplies recovered in 1985 from the effects of a drought the year before. The biggest change, though, was nuclear power's 19 percent growth, pushing its share of total energy supplies to almost 10 percent, in third place after coal and oil. Japanese nuclear reactors operated at a record rate of capacity, averaging 70.2 percent, a full two percentage points above the previous year.

Consumption - The trends in energy consumption present a mixed picture (Tables 9-10). Japanese households clearly voted in favor of electricity while holding the line on demand for other energy sources. At the same time, the industrial sector's appetite was again restrained, dropping in 1985 and the first few months of 1986. The continuing loss of international competitiveness of Japan's energy-intensive industries accounts for weak demand by some industries. Electricity and propane expanded their share in industry's energy supply picture, continuing the movement away from oil-based and coal sources. According to MITI, industrial restructuring helped keep energy consumption growth down to 0.5 percent in fiscal 1985, counterbalancing the upward push of increased output (Table 11). Not surprisingly, Japanese industry continued to improve its overall energy efficiency in FY 1985. Over a six-year period, the industrial sector has steadily become 2% percent more energy efficient -- an important factor in maintaining international competitiveness (Table 12).

Time For A Change

One would think that everything was coming up roses for consumers and policymakers alike -- prices have fallen, supplies are more than adequate and energy efficiency continues to rise. In fact, Japan is suffering from too much of a good thing. The sharp price declines and oversupply of energy have altered end-user attitudes and put new pressures on policymakers.

Tokyo's complicated structure of import controls, taxes and subsidies stems from actions taken in the immediate postwar years -- actions accepted by businesses and individuals as a necessary part of the reconstruction effort. These measures also proved useful in managing the impact of the oil shocks of the last decade. In the 1980s, however, they have exacerbated the problems. Falling oil prices have put pressure on the carefully regulated pricing policy employed for all types of energy. Since oil is the benchmark, this has brought calls for price cuts on alternative sources of energy from industrial and individual consumers. This trend has been amplified by the appreciation of the yen, since nearly all imported energy sources are bought with dollars.

New refineries in the Middle East are changing the face of global markets for petroleum products. Japan and other Western industrial nations have

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agreed to expand oil product imports to accommodate the expected increase in supplies. Tokyo has been encouraging consolidation and capacity reduction in the oil industry for several years but the international commitment has added a further dimension to the need for structural change.

While the price collapse may be short-lived the other two changes are probably not. The strong yen not only influences prices but may influence demand through a shift away from dependence on export-oriented manufacturing industries. In the medium term, at least, demand is likely to be depressed as the economy adjusts. The competitiveness of Japanese refineries will also suffer from the yen's rise, which has made foreign refined products even cheaper. This, coupled with refinery overcapacity, will put extreme pressure on Japanese oil companies and government policies that favor them.

Oil Policy

The market for crude and refined petroleum products in Japan is tightly controlled by the government. Import restrictions, production guidelines and price structures form a tight network under the guidance of the Ministry of International Trade and Industry (through its Natural Resources and Energy Agency). A ban on the imports of highly refined petroleum products plus fixed prices encouraged Japanese oil companies to over-build refinery capacity. This, along with a plethora of retail outlets for gasoline and controlled prices for kerosene and other products, has depressed oil company earnings for the past several years. The global glut of oil, the strong yen and slower economic growth have all combined to change this.

For the first half of fiscal 1986 (April-September), eight major Japanese oil companies reported sales declines of between 20 and 39 percent, although they earned enough to put them in the black. In fact, profits due to exchange rate changes (Y36.8 billion or $237.4 million at Y155=$1.00) were greater than normal operating profits (Y30.5 billion or $196.8 million). While this was a welcome development, oil company officials were more interested in pressing MITI to ease its controls so they could take advantage of the yen's strength, import more refined products and price their products more competitively.

At the same time Japan's 1985 commitment to the International Energy Agency, made up of Western industrial oil-consuming nations, also put pressure on MITI to liberalize imports of refined products. After prodding by allies and the prime minister, MITI issued licenses at the beginning of 1986 to the major oil companies to import gasoline on a limited scale. Imports rose from 3.3 million barrels in the first quarter of 1986 to 6.7 million in the third quarter. Although this amounted to just 12 percent of domestic production, it is still a significant improvement.

This hole in the policy dike only encouraged oil companies and end-users to press for greater reforms, leading to MITI's decision in November 1986 to establish the Committee to Study Basic Problems of the Oil Industry. By June the group hopes to draft a program to liberalize and rationalize the entire oil industry over a five-year period beginning in fiscal 1987. The committee will review current policies relating to both production and sales in view of new long-term supply projections, oil product trade, and oil stockpiling policies.

A guiding principle is the replacement of government controls with free-market mechanisms. MITI also plans to accelerate its program to reduce refining capacity. (Japanese refineries operate at only about 60 percent of capacity, compared with average rates of over 70 percent for facilities in Europe and the United States.) Policymakers will also scrutinize the country's labyrinthine fuel distribution system to improve the entire industry's international competitiveness. MITI apparently wants to make Japan a more hospitable market for major international oil companies as well as oil suppliers.

In December 1986 MITI began issuing oil product export licenses to oil companies. Ministry officials hope that this will help alleviate the pressures of slack domestic demand but expect that exports will be extremely limited in scope. For one thing, exports to the United States and South Africa are not permitted; for another, government and industry officials agree that when the costs of bringing crude oil all the way to Japan are considered, a reasonable export price will be difficult to achieve. At the moment Japanese oil companies are using the new flexibility to arrange swap deals with Southeast Asian producers. Mitsubishi Oil Co., Ltd., for example, will swap 145,000 barrels of gasoline for an equal amount of Bintulu condensate from Malaysia's state-run Petronas oil company. In any event, MITI will evaluate export licenses on an individual basis to insure that prices and supplies are not distorted.

MITI has already begun to allow markets more freedom to set prices, as indicated by the fact that retail prices for gasoline, kerosene and propane have been allowed to drift downward. Gasoline prices in the Tokyo metropolitan area fell from Y143 ($0.92) per liter in January 1986 to Y120 ($0.77) in October; kerosene dropped Y280 ($1.81) per 18 liters to Y1,116 ($7.20); and propane declined from Y5,109 ($32.96) per 1,000 cubic meters to Y4,865 ($31.39). While these adjustments do not match the fall in import prices, they do represent an easing of the ministry's hard-line policy.

Coal Policy

The sharp drop in crude oil prices plus the opening of several Canadian and Australian coal mines precipitated a crisis for the domestic coal industry in 1986. Both factors pushed prices of all types of coal down so much that the price differential between a metric ton of domestic coal and imported coal reached a stunning Y16,000 ($103.22). Japan's steel and power companies have been forced to buy the price-supported domestic coal, adding as much as Y100 billion ($645.1 million) to their annual fuel costs. Facing a deep depression, Japanese steel companies rebelled against the government's policy and refused to purchase domestic coal. After intense negotiations with MITI in October, the domestic price of coking coal was reduced by Y1,000 ($6.45) per metric ton to Y23,280 ($150.19) effective April 1, 1987, and steel makers will be allowed to purchase as much as 46 percent less domestic coal. This pact encouraged electric utilities and other major users of steam coal to press the ministry for a similar arrangement. MITI was less sympathetic to their claims but in the end agreed to reduce the price of domestic steam coal by Y500 ($3.23) per metric ton to Y19,470 ($125.61) for FY 1987.

Not surprisingly, these developments were greeted with dismay by the coal industry. In the wake of the price cuts, every major mine announced plans to slash output and employment; some went so far as to threaten a complete

shutdown. Fortunately, MITI was in the midst of drawing up a new five-year coal policy and after closed-door talks, released its 8th Coal Policy in mid-November. The report recognizes that the price differential between domestic and foreign coal has reached the point where the domestic industry is no longer viable in its present form. It recommends rapid consolidation and capacity reduction in the domestic industry, suggests the government establish a coal stockpile to absorb some domestic production until the mines can be closed, and proposes employment adjustment assistance for industry employees. Users will be allowed to slowly reduce their purchases of domestic coal except for the power companies, which will be forced to continue to purchase as much as 8.5 million metric tons a year.

By 1991 the government expects domestic output to fall to 10 million metric tons a year, well below the current 16 million metric ton level. This will probably force six to eight of the eleven operating mines to close. The resulting layoffs will surely strain the resources of the prefectural governments. The Ministry of Labor is planning new job training and other adjustment programs for the areas expected to be hardest hit.

New Energy Vision

It is not surprising that all this ferment prompted MITI to begin work on a new energy analysis, referred to as a "vision." Unlike the committee studying a new oil policy, this study group drafted a report long on generalities. The vision was to serve as a guide to reforming policies to meet demand as far in the future as the year 2030.

The report, which was released this past December, anticipates that the use of oil in Japan will continue to decline, replaced by coal, natural gas and nuclear power. In addition, solar, geothermal, biomass and other alternative energy sources will be in full-scale use. This will present users with a much wider choice of energy sources and will lead to the widespread use of decentralized power systems. Assuming this last development occurs, the proportion of purchased energy will decrease as neighborhoods or factories are supplied by a local power source, independent of a utility's power grid. Nevertheless, electricity is seen as the dominant form of energy because it can be generated from many sources. Transportation, according to the report, will be driven by non-oil based fuels -- hydrogen, methanol and ethanol.

This is described as the multiple energy era, which means that a high degree of diversification of supply will be achieved, increasing energy security and enhancing energy supply flexibility. The government's responsibility is as follows:

- To develop energy-related technologies - "Technological advances can bring fundamental solutions to energy problems by reducing real dependence on foreign energy; bringing flexibility to energy supplies; promoting energy efficiency; and improving the quality of life by introducing new appliances."

- To establish an appropriate competitive environment - Starting with an effort to decentralize energy sources, it must create conditions that are responsive to changing demands and that facilitate technological development. A smooth shift to a price system based on competition among all forms of energy will be necessary (i.e. the price of oil will cease to be a benchmark).

• To formulate a strategic international resources policy - A vision of the future structure of industry must guide the internationalization of the oil industry and the development of new energy sources. This effort should include not only evening out periods of peak demand but also coordinating international energy policy, stabilizing global oil markets, and coordinating international studies of environmental problems.

The authors of the study note that if new policies are not implemented, Japan's energy consumption could grow by 2.4 percent annually through the year 2000 and 1.3 percent thereafter, reaching 860 million kiloliters of crude oil equivalent. If new policies are enforced, consumption is forecast to grow by 1.6 percent a year until 2000 and 0.8 percent through 2030, translating into total consumption of 660 million kiloliters of crude oil equivalent annually. The prospect of achieving the same amount of economic growth using nearly 25 percent less energy is certainly tempting.

Conclusion

Events of the past two years have had as great an impact on Japanese energy policy as the oil shocks of the 1970s. In some ways, it amounts to a "reverse" oil shock -- sharp price declines coupled with a glut of supplies. While supply almost certainly will come back into line with demand, it is unclear if prices will ever climb back to their previous levels. Amplified by the stronger yen, this change has forced Tokyo to review its basic energy policies.

A fundamental shift is taking place. Tokyo is beginning to move away from tight central control over all aspects of energy markets and is embracing policies more open to international markets. This clearly implies a great number of changes, both in government and the private sector. It also opens opportunities for foreign energy companies since Japan will certainly scour the globe for answers to its problems. It is a time of change for Japanese energy policy, hopefully for the better.

For further information, contact Jon Choy.

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The views expressed in this report are those of the author and do not necessarily represent those of the Japan Economic Institute.

Table 1: Japan's Energy Consumption by Source, FY 1985

(in millions of kiloliters of crude oil equivalent and percent change)

	Industry	Transportation	Other	Total
Oil	83.3	63.4	35.1	181.8
	(-2.0%)	(2.2%)	(2.9%)	(0.3%)
Coal	56.6	0	0.4	56.9
	(0.9%)	--	(-14.6%)	(0.8%)
Electricity	82.6	3.5	62.4	148.5
	(2.1%)	(2.3%)	(5.1%)	(3.3%)
Propane	3.1	0	10.2	13.3
	(8.9%)	--	(3.4%)	(4.6%)
Others	10.8	0.3	1.1	12.3
	(-1.0%)	(6.3%)	(7.9%)	(-1.0%)
Total	236.3	67.3	109.2	412.8
	(0.2%)	(2.2%)	(4.2%)	(1.6%)

Source: Ministry of International Trade and Industry

Table 2: Japan's Energy Suppply by Source

(in millions of units)

	FY 1984			FY 1985			
	Actual	Crude Oil Equivalent	Share	Actual	Crude Oil Equivalent	Share	Percent Change
Oil (kl)	259.6	259.6	59.6%	248.7	248.7	56.7%	-4.2%
Coal (mt)	106.2	80.5	18.5	110.9	83.6	19.1	3.8
Nuclear (kw)	20.7	35.0	8.0	246.9	41.7	9.5	19.0
Natural Gas (kl)	40.0	40.0	9.2	41.3	41.3	9.4	3.4
Hydroelectric (kw)	33.9	19.1	4.4	34.5	21.7	4.9	13.6
Alternatives (kl)	1.5	1.5	0.4	1.7	1.8	0.4	8.8
Total		435.8	100.0		438.8	100.0	0.7

Source: Ministry of International Trade and Industry

Table 3: Japan's Crude Oil Imports, Production and Inventories

(in thousands of barrels)

	Production	Imports	Throughput	Rate of Operation	Inventories
1980	3,177	1,615,480	1,462,123	67.3%	238,020
1981	2,868	1,448,203	1,321,353	60.9	226,302
1982	2,937	1,350,369	1,225,566	56.5	205,916
1983	3,095	1,307,024	1,181,136	56.9	185,870
1984	2,994	1,349,847	1,220,958	67.1	163,905
1985	3,931	1,247,496	1,130,973	62.3	160,288
1986					
1st Qtr	1,201	656,498	314,827	70.3	170,592
2nd Qtr	1,207	262,339	240,566	53.2	151,936
3rd Qtr	1,118	300,317	247,069	54.0	187,298

Source: Petroleum Association of Japan

Table 4: Price (c.i.f.) of Imported Crude Oil

	Volume (1,000 bbl)	Value ($millions)	Dollars per bbl	Yen per kiloliter
1980	1,600,352	$52,749	$32.97	Y47,197
1981	1,430,623	53,343	37.29	51,387
1982	1,334,958	46,266	34.66	53,906
1983	1,302,055	40,063	30.77	45,923
1984	1,314,034	39,379	29.36	43,713
1985	1,232,494	34,600	28.07	42,374
1986				
January	96,891	2,691	27.77	35,297
February	119,655	3,299	27.57	33,562
March	113,805	2,548	22.38	25,368
April	104,074	1,713	16.46	18,489
May	85,443	1,101	12.89	13,548
June	83,682	1,033	12.35	13,146
July	90,468	1,075	11.88	12,191
August	104,122	1,076	10.34	10,081
September	95,042	1,030	10.84	10,545
October	96,781	1,235	12.76	12,382

Source: Ministry of Finance

Table 5: Japan's Non-Crude Oil Energy Imports

(in thousands of units)

	Coal (mt)	Naphtha (kl)	Fuel Oil (kl)	LPG (mt)	LNG (mt)
1980	68,570	7,363	7,431	9,725	16,324
1981	77,959	7,241	7,404	10,097	16,833
1982	78,535	8,998	6,893	11,861	17,480
1983	75,124	13,096	7,285	10,860	18,748
1984	87,227	13,414	7,342	11,320	25,738
1985	93,448	14,896	7,493	11,540	27,556
1986					
January	8,168	1,577	473	883	2,540
February	6,932	1,122	485	969	2,274
March	7,178	1,223	724	1,156	2,476
April	8,091	1,200	370	1,048	2,171
May	7,750	1,255	548	952	2,282
June	7,655	1,381	517	776	2,084
July	8,618	1,461	655	967	2,360
August	7,039	1,519	430	788	2,346
September	7,655	1,761	651	929	2,470

Table 6: Japan's Consumption of Non-Crude Oil Energy

(in thousands of units)

	Coal (mt)			Heavy Fuel Oil (kl)				LPG (mt)			LNG (mt)	
	Coke	Steel	Power	Agri-culture	Manufac-turing	Ship-ping	Power	Chemi-cals	Power	Motor vehicles	Resi-dential	Power
1980	2,859	58,896	1,671	6,433	43,747	6,154	38,360	4,485	3,327	1,548	3,180	12,554
1981	3,906	60,854	4,082	6,444	35,690	4,730	34,5[illegible]	4,465	2,707	1,241	3,411	12,857
1982	3,389	59,447	5,233	6,323	30,209	4,365	30,983	4,465	2,707	1,241	3,411	12,857
1983	3,652	54,570	7,742	5,707	27,769	4,112	29,476	4,047	3,082	1,822	4,195	14,039
1984	4,069	62,716	9,424	6,086	26,655	4,909	29,220	5,029	3,381	1,843	5,561	19,606
1985	4,908	63,961	13,884	1,303	24,853	4,709	22,271	5,176	3,321	1,722	5,589	21,396
1986												
January	419	5,247	1,598	237	2,241	375	1,888	494	278	136	644	1,838
February	432	4,853	993	241	2,139	384	1,826	416	271	111	540	1,676
March	324	4,881	1,049	172	2,071	390	1,814	387	330	129	664	1,755
April	355	5,620	1,169	94	2,001	376	1,331	410	274	132	616	1,498
May	531	5,137	1,154	78	1,773	358	1,137	353	276	162	567	1,657
June	313	5,447	1,197	63	1,653	361	1,080	439	259	135	522	1,562
July	416	5,793	1,310	59	1,939	394	1,651	415	286	164	424	1,935
August	289	5,019	1,083	38	1,713	344	1,599	452	263	159	389	1,900
September	532	4,623	1,096	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	448	1,965

Source: Ministry of International Trade and Industry

Table 7: Output of Electric Utilities in Japan

(in billions of kilowatt hours)

	Total	Hydro	Thermal	Nuclear
1980	514.05	85.15	346.90	82.01
1981	523.14	83.74	352.18	87.23
1982	522.48	77.34	343.30	101.84
1983	555.49	81.39	360.98	113.12
1984	580.41	70.65	378.32	133.23
1985	603.93	81.19	363.75	158.98
1986				
January	52.00	5.03	32.00	14.97
February	49.22	3.66	32.12	13.45
March	51.16	5.01	31.74	14.41
April	46.28	8.16	25.84	12.28
May	46.35	10.41	23.20	12.73
June	48.35	8.78	24.63	14.94
July	54.67	10.26	29.11	15.29
August	56.09	6.94	34.20	14.59

Table 8: Japan's Electricity Consumption

(in billions of kilowatt hours)

			Power				
				Manufacturing			Rail-
	Total	Light	Total	Total	Chemicals	Steel	roads
1980	464.25	105.27	353.98	190.77	26.79	61.80	12.71
1981	470.56	110.30	360.27	184.29	26.28	58.49	12.86
1982	471.44	112.79	358.65	177.95	29.22	53.69	13.06
1983	499.78	122.22	377.57	182.62	27.55	55.47	13.33
1984	524.53	127.51	397.02	191.97	28.76	57.04	13.13
1985	541.39	133.30	408.09	193.75	28.23	55.88	13.44
1986							
January	48.05	13.79	34.26	15.46	2.31	4.54	1.25
February	45.65	12.29	33.36	15.26	2.15	4.34	1.11
March	44.43	11.08	33.35	16.06	2.23	4.63	1.18
April	43.37	11.05	32.32	15.57	2.22	4.49	1.05
May	42.36	10.50	31.86	15.29	2.22	4.41	1.07
June	41.52	9.16	32.36	15.84	2.31	4.37	1.05
July	44.69	10.04	34.65	15.90	2.15	4.17	1.15
August	49.60	12.65	36.96	14.71	2.10	3.95	1.21

Source: Ministry of International Trade and Industry

Table 9: Household Energy Consumption in Japan

	Electricity (mil kwh)	Propane (bil kcal)	Kerosene (1,000 kl)	LPG (1,000 mt)	Other Solids (1,000 mt)	Coal (1,000 mt)
1980	103,199	56,008	16,725	4,984	1,212.3	578.5
1981	108,979	58,178	16,730	5,336	970.0	472.5
1982	110,051	58,200	15,275	5,295	1,173.0	512.8
1983	117,905	60,748	15,928	5,460	1,010.3	509.2
1984	125,588	66,065	17,130	5,696	1,413.2	469.1
1985	129,682	65,706	16,060	5,611	1,479.3	371.9
1986						
January	13,682	8,591	2,825	625	119.8	27.1
February	12,179	8,392	2,777	594	114.6	33.0
March	10,982	7,929	2,150	558	97.1	37.3
April	10,951	7,085	1,070	535	84.0*	7.8
May	10,396	5,913	640	492	81.3*	12.1
June	9,047	4,541	479	403	79.3*	18.9
July	9,899	4,242	472	381	67.6*	18.3
August	12,491	3,698	n.a.	n.a.	63.3*	20.6

*Partial data only.

Source: Ministry of International Trade and Industry

Table 10: Energy Consumption by Industry in Japan

(in kiloliters of crude oil equivalent)

	Metal Mining	Coal Mining	Textiles	Pulp, Paper and Cardboard	Chemicals	Petro-chemicals
1983	85,704	663,943	4,023,117	10,480,791	57,216,628	10,671,659
1-3 Qtr	61,799	466,083	2,977,585	7,790,477	42,848,661	7,869,633
1984	73,995	657,159	4,213,267	10,731,896	66,206,821	10,759,857
1-3 Qtr	55,046	485,572	3,159,121	7,977,411	49,082,889	8,010,169
1985	73,747	635,692	4,218,646	10,838,465	66,477,596	10,374,103
1-3 Qtr	55,346	471,932	3,135,525	8,063,115	49,342,700	7,713,921
1986						
1-3 Qtr	46,933	468,709	3,230,786	8,174,471	49,986,045	7,452,444

	Rubber Products	Nonmetallic Mineral Products	Steel	Nonferrous Ores and Metals	Machinery	Total
1983	421,307	15,482,503	45,462,302	4,375,242	13,676,921	133,909,803
1-3 Qtr	309,581	11,457,460	33,573,380	3,218,485	10,071,169	98,719,393
1984	428,331	14,493,878	50,509,329	4,427,235	15,249,193	142,880,126
1-3 Qtr	320,707	10,645,697	37,649,656	3,315,428	11,356,481	106,271,750
1985	415,468	13,527,752	50,763,316	4,250,973	15,393,058	141,789,300
1-3 Qtr	310,002	9,989,067	38,338,090	3,195,750	11,575,837	105,657,475
1986						
1-3 Qtr	325,611	9,309,195	35,671,539	3,026,657	11,015,656	103,956,811

Source: Ministry of International Trade and Industry

Table 11: Composition of Industrial Energy Consumption Changes in Japan

(in millions of kiloliters of crude oil equivalent)

	Overall Change in Consumption	As a Result of: Output Changes	Industrial Structure Changes	Unit of Measure Changes
FY 1980	-10.1	0.2	-7.4	-2.9
FY 1981	-13.8	1.0	-4.8	-10.0
FY 1982	-9.6	-2.8	-2.1	-4.7
FY 1983	5.3	10.4	-1.7	-3.4
FY 1984	7.2	14.9	-4.1	-3.6
FY 1985	0.5	4.6	-3.5	-0.6

Source: Ministry of International Trade and Industry

Table 12: Japan's Industrial Energy Efficiency

	Industrial Production Index (1980 = 100)	Industrial Energy Consumption Index (millions of kl of oil)	Derived Energy Efficiency Index (FY 1979 = 100)
FY 1979	99.0	231	100
FY 1980	99.1	218	94
FY 1981	99.6	202	87
FY 1982	98.1	186	81
FY 1983	103.9	191	79
FY 1984	112.4	198	76
FY 1985	115.0	199	74

Source: Ministry of International Trade and Industry